

### **REMARKS**

Claims 16-24 are pending in this application. The Applicants affirm the election made to prosecute Group II, claims 16-24. Claims 16-18, 23, and 24 have been amended to further define the invention. Claim 17 has been amended to overcome the Examiner's objection. The specification has been amended to correct minor typographical errors. The drawings have been formalized and amended as suggested by the Examiner. No new matter is presented by way of these amendments.

#### **Rejections under 35 U.S.C. § 112**

Claims 17, 23, and 24 have been amended to overcome the rejections under 35 U.S.C. § 112. Applicants respectfully request withdrawal of these rejections.

#### **Rejections under 35 U.S.C. § 102**

Claims 16-17 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent 6,337,163 to Sato. Applicants respectfully request removal of these rejections in light of the amendments and arguments discussed below.

Applicants respectfully submit that Sato does not teach each and every feature of claim 16, as amended. Sato provides for patterning a photoresist through the application of light exposure and electron beam exposure. The configuration of Sato requires that the underlying film 12, which may be an organosilicon compound, be below a resist layer 13 (See Figure 1A and column 97, lines 5-16). Claim 16 has been amended to include that the developed silicon-containing photoresist layer is disposed over a non-silicon containing photoresist layer. Sato further requires that the underlying film 12 be disposed

over a work film 11 which is a silicon based material, such as an interlayer dielectric (ILD) (See column 5, lines 25-34). Accordingly, for at least the above stated reasons, Applicants submit that claim 16 is not anticipated by Sato. Claim 17 depends from claim 16. Therefore, for at least the above stated reasons, Applicants submit that claim 17 is not anticipated by Sato.

**Rejections under 35 U.S.C. § 103**

Claim 18 was rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent 6,337,163 to Sato in view of U.S. Patent 5,899,748 to Tsai et al. As will be explained below, the combination of Sato and Tsai do not teach or disclose each feature of amended claim 18 or amended claim 16, from which claim 18 depends.

The present invention as defined by amended claim 18, provides a method for converting a top portion of a developed silicon containing photoresist layer disposed over a non-silicon containing photoresist layer. The silicon containing photoresist layer is exposed to ultraviolet (UV) light, thereby cross-linking polymer chains in the silicon containing photoresist. As a result of the interaction, a top portion of the first photoresist layer is converted to a nitride based hardened layer.

Applicants respectfully submit that nowhere does Sato teach or disclose the feature of a substrate with a developed silicon-containing photoresist layer disposed over a non-silicon containing photoresist layer or the feature of converting a top portion of the developed silicon-containing photoresist layer to a hardened layer when the developed silicon-containing photoresist layer is disposed over a non-silicon containing photoresist

layer. As mentioned above, Sato provides for patterning a photoresist through the application of light exposure and electron beam exposure. The configuration of Sato requires that the underlying film 12, which may be an organosilicon compound, be below a resist layer 13. Furthermore, Sato requires that light is used to detect information on a position of the first resist pattern in order to accommodate the hybrid exposure scheme. The light used to detect the first resist pattern is required to be of a wavelength that will not photosensitize the resist ( see column 106, lines 56-59). Moreover, the organosilicon layer defined as underlying layer 12 is highly etchable as compared to the resist layer 13 (See column 102, lines 16-22).

To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the reference or in the knowledge generally available to one having ordinary skill in the art, to combine the references. Additionally, the references when combined must teach or suggest all the claim features. As discussed below, the Examiner has not established a *prima facie* case of obviousness because one having ordinary skill in the art would not have combined the references in the manner proposed.

Specifically, there is no motivation to combine the references as suggested by the Examiner. Sato requires the use of a light source other than a wavelength that will photosensitize the resist. Tsai only provides for UV emission in the etch chamber. Thus, one skilled in the art would not combine Sato with Tsai as the etch chamber of Tsai can not perform the position location information through a light source that does not photosensitize the resist layer. Accordingly, Applicants respectfully submit that there is no suggestion or motivation to combine the references.

Furthermore, even if it is deemed that there would have been proper motivation to combine the references, a proposition with which Applicants disagree, the resulting combination would not include all the claimed features of claim 18, as amended. Claim 18 depends from claim 16 and as such includes all of the features of claim 16. As mentioned above, Sato fails to teach or suggest the feature of a substrate with a developed silicon-containing photoresist layer disposed over a non-silicon containing photoresist layer or the feature of converting a top portion of the developed silicon-containing photoresist layer to a hardened layer when the developed silicon-containing photoresist layer is disposed over a non-silicon containing photoresist layer. Tsai is silent to both of the aforementioned features, therefore, Tsai fails to cure the deficiencies of Sato.

Claims 19-23 were rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent 6,337,163 to Sato in view of U.S. Patent 5,899,748 to Tsai et al., further in view of U.S. Patent 5,123,998 to Kishimura, further in view of U.S. Patent 6,479,820 to Singh et al. further in view of U.S. Patent 4,980,563 to George et al. Applicants respectfully submit the Kishimura, Singh, and George references do nothing to cure the deficiencies of the Sato reference discussed above. Accordingly, claims 19-23 are patentable over the cited art for at least the reasons stated above.

Claim 24 was rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent 6,337,163 to Sato in view of U.S. Patent 6,451,512 to Rangarajan et al. Rangarajan teaches post development photoresist silylation of a photoresist under UV light. The Examiner states that it would have been obvious to combine the references to harden 2% to 100% of the developed photoresist layer to improve selectivity. Applicants respectfully submit that there is no motivation to combine the references as proposed by

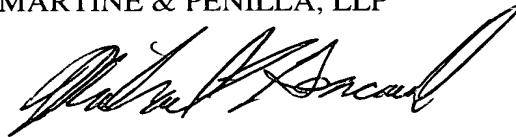
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the Examiner. Sato teaches an underlying organosilicon film. As the underlying film has a silicon component, there is no need to perform post development silylation. Furthermore, silylation of the underlying layer would cause the entire layer to become hardened, thereby, preventing the formation of the pattern under Sato. Thus, the combination as proposed by the Examiner would render Sato unsatisfactory for its intended purposes in that a subsequent pattern would not be able to be developed.

In view of the foregoing, Applicants respectfully submit that all of the pending claims are in condition for allowance. A notice of allowance is respectfully requested. In the event a telephone conversation would expedite the prosecution of this application, the Examiner may reach the undersigned at (408) 749-6900 x6921. If any fees are due in connection with the filing of this paper, then the Commissioner is authorized to charge such fees to Deposit Account No. 50-0805 (Order No. LAM2P257). A copy of the transmittal is enclosed for this purpose.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read "Michael L. Gencarella", written over a horizontal line.

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